# Book report

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Tutor： Professor Jin Qunhua
Time： 2019-7-17

The Journal of Arthroplasty 33 (2018) 3672–3677

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org


Primary Arthroplasty

# A 9-Year Outcome Study Comparing Cancellous Titanium-Coated Cementless to Cemented Tibial Components of a Single Knee Arthroplasty Design

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# Introduction

Total knee arthroplasty (TKA) → survival rate → 95%-98%（10-15y）

fifixation

- cemented
- cementless
- hybrid(cementless femoral and cemented tibial components

Cemented fixation has resulted in satisfactory long-term outcome with low revision rates  However,osteolysis often appears and the long-term durability of the interface is under question, especially in young patients

Cementless fixation was developed in order to achieve a more physiological bond between implants and bone and in order to improve longevity of the interface especially in young patients. It has been available for more than 3 decades . Due to the less than optimal outcomes of the old generation of prostheses, cementless fifixation in TKA never gained popularity。

The indications and number of TKA continue to increase, especially for young patients. However, people still worry that these cement-implanted implants will not last for many patients

Cementless fixation technology has been developed

Compare the difference between cemented and cementless TKA

The document report 8- to 9-year clinical and radiological outcomes of the cementless compared to the cemented components of the Advance Medial-Pivot (aMP) TKA system

# Patients and Methods

Group A：From January 2009 to February 2010,
50-70y KOA requiring TKA

Inclusion criteria :KOA, 50-70y, good mental health, less than 20° varus or valgus deformity, fifixed flexion deformity of less than 20°, flexion greater than 90°, body mass index (BMI) less than 35.

Exclusion criteria :rheumatoid arthritis, previous surgery on the same joint, arthritis of the ipsilateral hip, contralateral hip, or knee joints.

# Patients and Methods

For reasons of comparison,

Group B: from January 2008 to January 2009,
fulfifilling the same inclusion and exclusion criteria
matched for age, gender, side, and BMI

Patients of both groups were evaluated and compared at the same matching time intervals of follow-up evaluation.

In patients of group A, the aMP system (MicroPort Orthopaedics Inc, Arlington, TN) cementless components (titanium porous beadecoated femoral component and cancellous titanium-coated, BIOFOAM tibial component) were implanted.

In patients of group B, the aMP system cemented components were implanted

Clinical and radiological assessment in both groups

Statistical Analysis

the t-test and the paired t-test were used in order to evaluate possible statistical differences of values within and between groups

Kaplan-Meier analysis with calculation of 95% confifidence intervals was performed to calculate survivorship

P ≤0.05 was considered significan

# Result

**Table 1**
Patient Demographics in Both Groups Are Shown.

| Demographics | Group A | Group B |
|---|---|---|
| Number of patients | 54 | 54 |
| Mean age at surgery in y (range) | 63.2 (52-70) | 63.8 (55-70) |
| Gender (female/male) | 36/18 | 37/17 |
| Left/right knee | 30/24 | 29/25 |
| Mean BMI value (range) | 32 (26-35) | 31.5 (25-35) |
| Diagnosis | | |
| Osteoarthritis | 46 | 44 |
| Seronegative arthritis | 6 | 9 |
| Post-traumatic arthritis | 2 | 1 |

BMI, body mass index.

mean final follow-up 8.6 years (8-9)

**Table 2**

Preoperative and Postoperative Mean Values (Range) of Objective and Subjective Clinical Outcome Rating Scales, Used in the Study, Are Shown.

| Clinical Rating Systems | Group A | Group B | Difference |
|---|---|---|---|
| Objective knee score | | | |
| Preoperative | 35.6 (16-67) | 32.8 (14-70) | *t*-test, non-s.s. |
| Final follow-up | 98.1 (94-100) | 95.8 (85-100) | *t*-test, non-s.s. |
| Difference | Paired *t*-test, $P = .001$ | Paired *t*-test, $P = .001$ | |
| Objective function score | | | |
| Preoperative | 46.4 (10-60) | 46.5 (20-50) | *t*-test, non-s.s. |
| Final follow-up | 97 (90-100) | 95.1 (85-100) | *t*-test, $P$~.01 |
| Difference | Paired *t*-test, $P = .01$ | Paired *t*-test, $P = .01$ | |
| Objective total score | | | |
| Preoperative | 84.1 (45-115) | 85.9 (57-110) | *t*-test, non-s.s. |
| Final follow-up | 196.3 (180-200) | 194.2 (115-200) | *t*-test, non-s.s. |
| Difference | Paired *t*-test, $P = .001$ | Paired *t*-test, $P = .001$ | |
| Subjective SF-12 physical component | | | |
| Preoperative | 26.6 (20-40) | 27.2 (20-40) | *t*-test, non-s.s. |
| Final follow-up | 48.5 (34-56.2) | 49.1 (30-56) | *t*-test, non-s.s. |
| Difference | Paired *t*-test, $P = .01$ | Paired *t*-test, $P = .01$ | |
| Subjective WOMAC | | | |
| Preoperative | 31.8 (14-54) | 32.4 (16-50) | *t*-test, non-s.s. |
| Final follow-up | 69.2 (37-85) | 70.1 (35-80) | *t*-test, non-s.s. |
| Difference | Paired *t*-test, $P = .001$ | Paired *t*-test, $P = .001$ | |
| Subjective Oxford knee score | | | |
| Preoperative | 44.3 (38-50) | 43.8 (39-51) | *t*-test, non-s.s. |
| Final follow-up | 22 (14-28) | 23.3 (20-32) | *t*-test, non-s.s. |
| Difference | Paired *t*-test, $P = .01$ | Paired *t*-test, $P = .01$ | |

当在不同时间间隔和末次随访时组间比较

同组内比较

AKS

**Table 3**

Preoperative and Postoperative Mean Values (Range) of Alignment Parameters for Both Components Are Shown.

| Radiological Evaluation | Group A | | Group B | |
|---|---|---|---|---|
| | Preoperative | Postoperative | Preoperative | Postoperative |
| Mean femoral valgus angle (α) | 96 (93-101) | 97 (92-102) | 96 (94-103) | 97 (93-101) |
| Mean tibial angle (β) | 89 (82-93) | 88.5 (81-93) | 89 (81-94) | 89 (83-93) |
| Mean femoral flexion (γ) | 1 (–3 to 4) | 1 (–3 to 4) | 1 (–3 to 4) | 1 (–3 to 4) |
| Mean tibial slope (σ) | 87 (82-91) | 85 (83-92) | 86 (83-91) | 85 (81-92) |
| Mean knee alignment | 5 valgus (8 valgus-4 varus) | 4.7 valgus (7 valgus-4 varus) | 5.2 valgus (8 valgus-5 varus) | 4.8 valgus (7 valgus-3 varus) |

There was no radiological evidence of osteolysis due to polyethylene wear debris in any knees in both groups

result 4:

No implant-related, patient-related, or surgeon-related failures were recorded in either group and no revision surgery was performed on any patients in either group.

Kaplan-Meier survivorship analysis showed a cumulative success rate of 100% (95% confifidence interval, 100-100) at 9 years,in both groups with revision for any reason (including aseptic loosening, instability, infection, and dislocation), revision for aseptic loosening, and revision for all indications (including secondary patellar resurfacing) as the end points

# conclusion

Old cementless TKA designs produced unsatisfactory midterm and long-term outcomes for various reasons. Clinical outcomes of newer designs are comparable to those of cemented designs. The application in TKA designs of new materials and technologies shows promising midterm to long-term results .

The issue of the cost-effectiveness of such technologies, either in young or in all patients generally, remains unclear because cementless TKAs cost 3 times more than cemented TKAs in most countries .


Thank
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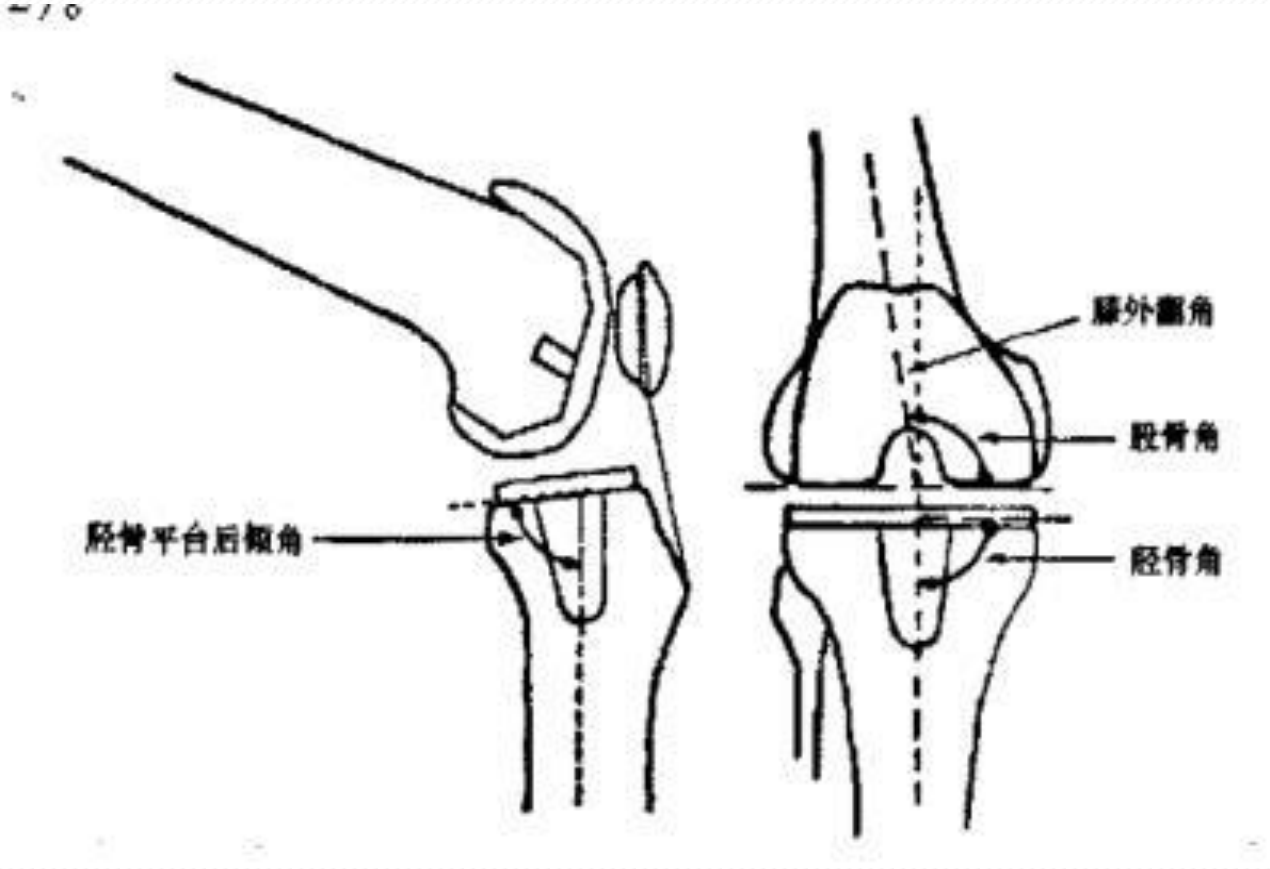


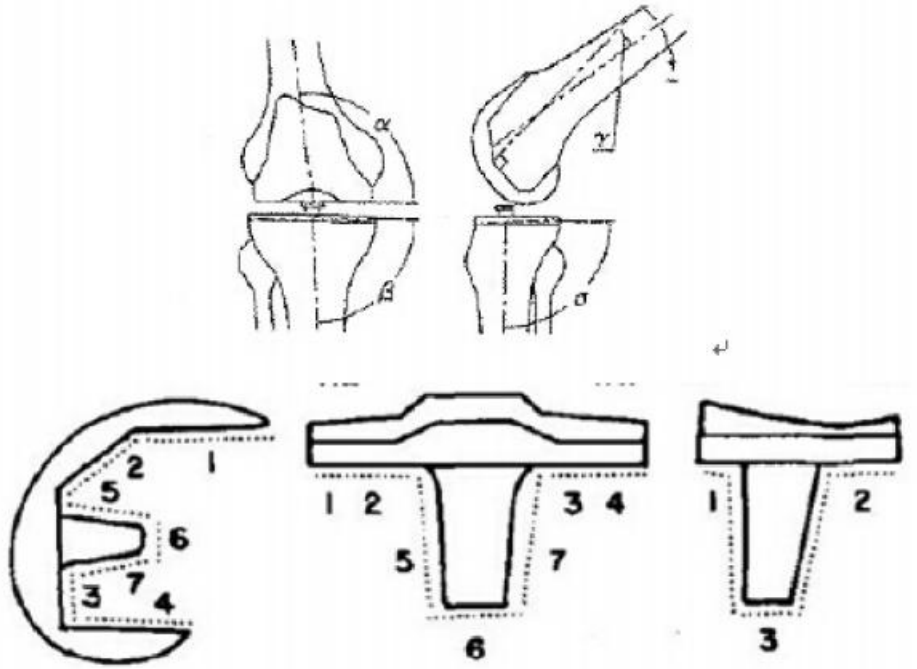



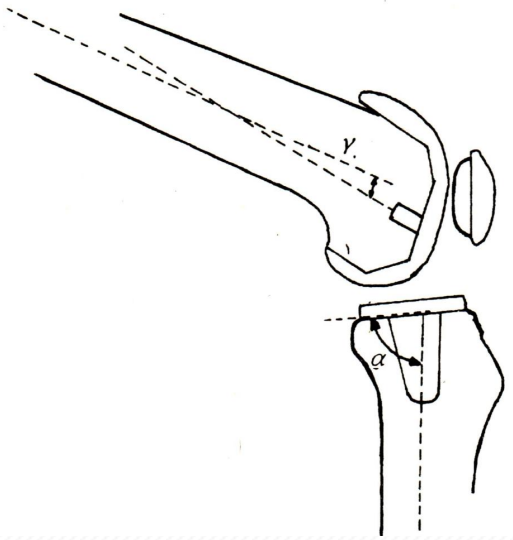

图 3 影像学测量示意

Fig. 3 Roentgenographic Evaluation

注：股 - 胫夹角(FTA)、股骨角(α)、胫骨角(β)、股骨屈曲角(γ)、胫骨平台后倾角(δ)。

# 胫骨平台假体后倾角

正常的胫骨平台一般后倾3°-7°，由于胫骨平台前面的松质骨越远离关节面强度越差，如果此处骨质切除较多，势必会减弱对假体的支承能力，因此应尽量多保留一些胫骨前面骨质，取后倾3°-7°。理论上讲，假体绝对不允许前倾，否则膝关节屈曲时，会发生后方卡压，而且平台前面将承受异常增高的拉伸应力，导致假体松动。




# 股骨假体前屈角：γ

正常股骨干存在约5°的前弯弧度，术前测量前弯弧度为了解股骨假体在矢状面上的位置，如果假体安装时角度大于股骨本身弧度，将改变股骨髁假体矢状面上的应力分布状态，导致假体松动（常发生在股骨后髁）；反之，如果该角度减小，股骨髁假体的前翼将嵌入股皮质，造成局部应力集中，容易引起股骨髁应力骨折。